

(12) **United States Patent**
Walukiewicz et al.

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(54) **SINGLE P-N JUNCTION TANDEM PHOTOVOLTAIC DEVICE**

(56) **References Cited**

(75) Inventors: **Wladyslaw Walukiewicz**, Kensington, CA (US); **Joel W. Ager, III**, Berkeley, CA (US); **Kin Man Yu**, Lafayette, CA (US)
(73) Assignee: **RoseStreet Labs Energy**, Phoenix, AZ (US)
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Primary Examiner — Jessica L Ward

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Assistant Examiner — Kevin E Yoon

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(74) *Attorney, Agent, or Firm* — Greenberg Traurig, LLP; Bradley D. Blanche

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Related U.S. Application Data

(57) **ABSTRACT**

(62) Division of application No. 11/777,963, filed on Jul. 13, 2007, now Pat. No. 8,039,740.
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(52) **U.S. Cl.** **136/261; 136/262**
(58) **Field of Classification Search** **136/243-265**
See application file for complete search history.

A single P-N junction solar cell is provided having two depletion regions for charge separation while allowing the electrons and holes to recombine such that the voltages associated with both depletion regions of the solar cell will add together. The single p-n junction solar cell includes an alloy of either InGa_N or InAl_N formed on one side of the P-N junction with Si formed on the other side in order to produce characteristics of a two junction (2J) tandem solar cell through only a single P-N junction. A single P-N junction solar cell having tandem solar cell characteristics will achieve power conversion efficiencies exceeding 30%.

17 Claims, 4 Drawing Sheets

